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Talking Trauma: A Layman's Guide to the Grisly Details

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Last week, after a 13-year-old student in Prince George's County became the eighth known target of a sniper's bullet, Martin Eichelberger, chief trauma surgeon at Children's National Medical Center, discussed the child's wounds and prognosis at a news conference.

Eichelberger spoke clearly enough to be understood by laymen. You can't always count on physicians to do that -- something that ER docs like myself know only too well.

In case you ever have to listen closely to a doctor describing the consequences of a sudden injury, here's a summary of what you may want to know.

Head and Spine Injuries For both penetrating (knife, bullet) and blunt injuries, a patient's condition upon arrival for medical care often predicts the final outcome. It is rare that a patient with a neurologic injury who is awake and moving arms and legs will spiral downhill, but unfortunately the converse is also true: Comatose or paralyzed patients face the longest odds. When collections of blood from a blunt impact or so-called "foreign bodies" are surgically removed, the danger isn't over: Brain swelling (aka cerebral edema) often develops over several days. The higher the velocity of the original impact, the more likely cerebral edema is to develop. And while there are ways to limit the effects of brain swelling, there are no proven cures or antidotes.

Chest Injuries At the top of what trauma surgeons call the "cone of death" is the head and neck; the base is the heart and the "great" blood vessels -- the aorta and vena cava, which run vertically in the center of the chest. Penetrating injuries here are literally a race against time: Only those who get to a hospital fast enough can have their blood restored and lacerations of heart or blood vessels repaired. Time is also critical with blunt injuries. When, say, a chest is thrown against a steering wheel in a high-speed accident, the heart and lungs may become severely contused, or bruised. The mainstay of treatment is largely supportive care. Patients are put on a ventilator to control breathing, and a variety of medications can control cardiac arrhythmias or maintain the heart's pump functioning. But, as with the young victim of last week's shooting, once surgery is finished, survival is out of the doctors' hands. The lower the impact and the healthier the patient, the greater the odds that the compromised circulation and ventilation can weather internal damage and subsequent healing responses.

Abdominal Injuries It sounded ominous last week when Eichelberger listed the organs that had to be removed, in full or in part, during the boy's surgery: the stomach, the pancreas, the spleen. The truth is that abdominal organs are mercifully redundant. The spleen performs a variety of functions -- storing and

filtering blood, producing immune cells -- that are performed elsewhere in the body. Thus, losing a spleen carries few long-term consequences. So, too, the stomach. A large portion can be removed without jeopardizing its function of holding food. The pancreas produces vital hormones, but with even a modest portion left, the body can function normally. The main hazard in abdominal trauma is bleeding. A torn aorta, vena cava or fibrous liver or spleen capsule can lead to lethal internal bleeding. Again, the faster one makes it in to the trauma bay, the better the chances of survival. Post-op recovery is more reliable than is the case with thoracic or neurologic wounds.

Extremity Injuries The most dramatic decision a trauma doctor has to make is whether to amputate a limb. A fracture alone, no matter how shattered the bone, is not in itself generally a reason for amputation. But crush injuries or severe damage to nerves and blood vessels at or above the knee and elbow, however, may necessitate amputation. Experience has shown that initially saving a badly wounded arm or leg only makes it harder on the patient if it later has to be amputated. Therefore, crucial decisions must be made quickly, even if the patient is unconscious.

Shock and Infection These are the big, looming problems in trauma care. The true medical state of shock exists when there is insufficient blood to meet the needs of the body. The body responds by trying to clamp down blood flow to nonessential organs -- that is, everything except the brain, heart, lungs, liver and kidneys. Simultaneously, the formation of blood clots at bleeding sites chews up all prefabricated clotting proteins and activates immune cells. So unless these blood components can be transfused fairly quickly, the cascade of bleeding can itself prove to be fatal (and can lead to cerebral and pulmonary edema). As a secondary effect, in the first days and weeks out, this also depletes the body's ability to fight infection. Someone who makes it through initial surgery, therefore, also faces the prospect of an overwhelming infection at the same time that organ failure is most likely. The fewer body areas injured, the more likely the patient is to pull through.

A week after the shooting, the 13-year-old appeared to be faring well.

-- J.B. Orenstein